CLAIMS

What is claimed is:

1.   A method for use in receiving a plurality of data signals transmitted over a shared spectrum in a time slot in a time division duplex communication system using code division multiple access, the method comprising:

        receiving a combined signal over the shared spectrum in the time slot;

5   grouping the plurality of data signals into a plurality of groups;

        match filtering the combined signal based on in part symbol responses associated with the data signals of one of the groups;

        jointly detecting data from each data signal in the one group;

        constructing an interference signal based on in part the one group detected data;

10   subtracting the constructed interference signal from the combined signal; and

        determining data from a group other than the one group by processing the subtracted signal.

2.   The method of claim 1 wherein the jointly detecting is performed using least squares estimation.

3.   The method of claim 1 wherein the jointly detecting is performed using minimum mean square error estimation.

4.   A method for use in receiving a plurality of data signals transmitted over a shared spectrum in a time slot in a time division duplex communication system using code division multiple access, the method comprising:

        (a)   receiving a combined signal as an input signal over the shared spectrum in the

5   time slot;

(b)   grouping the plurality of data signals into a plurality of groups, at least one of the groups having a plurality of data signals;

(c)   match filtering the input signal based on in part symbol responses associated with each data signal of a first group of the groups;

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(d)   jointly detecting data from each data signal in the first group;

(e)   constructing an interference signal based on in part the first group detected data;

(f)   subtracting the constructed interference signal from the input signal as an input signal for subsequent processing;

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(g)   match filtering the subtracted signal based on in part symbol responses associated with the data signal of a subsequent group of the groups;

(h)   jointly detecting data from each data signal in the subsequent group; and

(i)   successively repeating steps (e) through (h) for remaining groups of the plurality of groups where, for each remaining group, the subsequent group acts as the first

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group for that remaining group and that remaining group acts as the subsequent group.

5.   A method for use in a receiver for receiving a plurality of data signals transmitted over a shared spectrum in a time slot in a time division duplex communication system using code division multiple access, the method comprising:

receiving a combined signal over the shared spectrum in the time slot;

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estimating a received power level for each data signal;

selectively grouping data signals of the plurality of data signals based on in part the received power level of the data signals into at least one group; and

separately detecting data within each group for that group's data signals.

6.   The method of claim 5 wherein the estimating the received power level for each data signal is based on in part apriori knowledge at the receiver.

7. The method of claim 5 wherein the estimating the received power level for each data signal is based on in part a power level of a training sequence associated with each data signal.

8. The method of claim 5 wherein the estimating the received power level for each data signal is performed using a bank of matched filters, each matched filter matched to a code of a respective one of the data signals.

9. The method of claim 5 wherein the selectively grouping data signals groups data signals within a certain threshold power level into a group.

10. The method of claim 9 wherein the certain threshold power level is one decibel.

11. The method of claim 9 wherein the certain threshold is adjusted to achieve a desired bit error rate at the receiver.

12. The method of claim 5 further comprising forcing all of the data signals into a single group to override the step of selectively grouping.

13. The method of claim 5 further comprising forcibly grouping each data signal into its own group to override the step of selectively grouping.

14. A method for use in a receiver for adjusting a trade-off between complexity and performance in detecting data from data signals transmitted over a shared spectrum in a time slot in a time division duplex communication system using code division multiple access, the method comprising:

5   grouping the data signals into at least one group; wherein to reduce the complexity, increasing a number of data signal groups, and to increase the performance, decreasing a number of data signal groups; and

jointly detecting data in each group.

15.   The method of claim 14 further comprising:

determining a received power of each data signal; wherein the grouping is performed so that all data signals within each group are within a certain threshold power level and to reduce complexity, the certain threshold is increased and to increase performance, the certain threshold is reduced.

16.   The method of claim 14 wherein to reduce the complexity, each group contains one of the data signals.

17.   The method of claim 14 wherein to increase the performance, the at least one group is a single group.

18.   A receiver for use in a time division duplex communication system using code division multiple access, the system communicating using multiple communication bursts in a time slot, the receiver comprising:

an antenna for receiving radio frequency signals including the multiple communication bursts;

a demodulator for demodulating radio frequency signals to produce a baseband signal;

a channel estimation device for estimating a channel response for the bursts;

a successive interference cancellation joint detection (SIC-JD) device comprising:

10   a first joint detection block for detecting data within the baseband signal for a first group of bursts of the multiple bursts;

a first interference construction block for constructing an estimate of interference of the first group bursts;

a subtractor for subtracting the first group interference from the baseband signal; and

15   a second joint detection block for detecting data within the subtracted signal for a second group of bursts of the multiple bursts.

19.   The receiver of claim 18 wherein the SIC-JD device further comprises:

a plurality of additional joint detection blocks for detecting data for additional groups of bursts of the multiple bursts.

20.   The receiver of claim 18 wherein the SIC-JD device further comprises:

a first matched filter for processing the baseband signal to match symbol responses of the data signals in the first group; and

a second matched filter for processing the subtracted signal to match symbol responses of the data signals in the second group.

21.   The receiver of claim 18 wherein an output of the first and second joint detection blocks are soft symbols, the SIC-JD device further comprising a first and second soft to hard decision block for converting the first and second joint detection block outputs into hard symbols.

22.   A device for use in a receiver of a time division duplex communication system using code division multiple access, the system communicating using multiple communication bursts in a time slot, the device comprising:

an input configured to receive a baseband signal associated with received bursts

5   within a time slot;

a first joint detection block for detecting data within the baseband signal for a first

group of bursts of the received bursts;

a first interference construction block for constructing an estimate of interference of

the first group bursts;

10   a subtractor for subtracting the first group interference from the baseband signal; and

a second joint detection block for detecting data within the subtracted signal for a

second group of bursts of the received bursts.

23.   The device of claim 22 further comprising additional joint detection blocks for

detecting data for additional groups of bursts of the multiple bursts.

24.   The device of claim 22 further comprising:

a first matched filter for processing the baseband signal to match symbol responses

of the received bursts of the first group; and

a second matched filter for processing the subtracted signal to match symbol

5   responses of the received bursts of the second group.

25.   The device of claim 22 wherein an output of the first and second joint

detection blocks are soft symbols, the device further comprising a first and second soft to

hard decision block converting the first and second joint detection block outputs into hard

symbols.